

REMARKS

This paper is responsive to the Office Action dated April 20 2005. Claims 1 - 7 are pending in this application and have been rejected. Reexamination is respectfully requested in view of the following remarks.

Claim 1 has been rejected under 35 USC § 103 as being unpatentable over Masson '204, Morofuji '188 and a new reference Edwards '173. The rejection over Morofuji and Masson is essentially the same as that stated in the first Office Action with the exception of the language beginning with "the group of prisms, to . . ." beginning at page 2 of the Office Action and continuing through line 6 at page 3 and the discussion of Edwards which is at page 3 beginning at line 12 and continuing through line 18.

Edwards

Applicant respectfully submits that the Edwards reference is from a completely non-analogous and not relevant art to the Applicant's claimed invention. Edwards as shown in Figure 1 and also in Figure 2, shows light which impinges upon CCD (20) or CCD (22). The electromagnetic radiation of Edwards is never corrected for a shift in focal point, has no concern for longitudinal chromatic aberration arising in photographic lenses,

has no relationship to any optical filter, actuator for changing thicknesses of a variable thickness optical filter, correlation between photographing conditions and thickness of variable thickness optical filters. Instead, Edwards receives all light impinging on a CCD (20) which includes infrared visible and ultraviolet receptors comprising each pixel (column 4, lines 60 - 62) without any change in focal point. Once the pixel information is received, the pulse train is provided to de-interleave circuitry (24) which separates the pulse train into its corresponding infrared, visible and ultraviolet components. These signals are then provided to three dynamic range transformation circuits which are used to generate signals for the rest of the machine vision camera and video preprocessing system (see column 4, line 66 - column 5, line 14). Since Edwards utilizes light from infrared, visible and ultraviolet receptors simultaneously, it makes no sense to shift the focal point when changing from a visible light range to an infrared range. The reason for not shifting focal point is that all three ranges are used simultaneously. For this reason, Edwards cannot possibly suggest Applicant's claimed invention. Edwards does not show or teach anything about optics upstream from (20) or (22) Edwards is a solution to a problem that Applicant does not have.

The Examiner argues that Edwards produces a clear image during all visibility and weather conditions. This, however, is not what Applicant claims which is adjustment of a filter interposed between a photographic lens system and an image pickup

system to correct a shift in focal point caused by longitudinal chromatic aberration. Since Edwards always uses all visibility, such a shift and change in focal point would be counter productive.

Masson

The Examiner's argument beginning at line three up from the bottom of page two and continuing through page 3, line 6 is essentially directed to one of the two interdependent and coacting variable thickness filters taught in Masson '204. The Examiner, however, has failed to note that the filters are indeed interacting and coacting because they are geared together as shown in Figure 1 and as further described in the specification. The problem with the Examiner's allegation of obviousness becomes apparent when the Examiner argues a control means with an actuator. An actuator in Masson '204 would necessarily respond to a control means which would control both group 2 and group 3 simultaneously. Such an actuator cannot accomplish Applicant's claimed variable thickness because, as taught by '204, the total thickness always remains the same. Claims must be read in their entirety with the connection between elements, not as a catalog of unconnected, unrelated elements. Claims are read as a whole, see 35 USC § 103. This has not been done where the relationship between elements is not shown.

The Examiner argues that the group of prisms (2) are considered to be the variable thickness optical filter and group

3 is considered to be another variable thickness optical filter. However, the requirement in the claim that there be a memory for storing a correlation table defining a correlation between photographic conditions and the thickness of the variable thickness optical filter which can correct said in optical point, cannot occur. There will be no shift in optical point in '204 because the focal point remains the same. Therefore, when one attempts to combine all of the elements found in claim 1, it simply becomes impossible to suggest connection of the memory, the actuator, and the variable thickness portions of the claim as the Examiner argues. There must be teachings and suggestions in the references in order to make out a *prima facie* case of obviousness, see In Re Sernaker 27 USPQ 1.

Morofuji

In the previous Office Action and in this Office Action, the Examiner asserts that Morofuji also teaches a thickness control means for controlling an actuator on the basis of a memory. This is simply incorrect. Morofuji correction is based upon vibration, not focus and thickness control as claimed.

The Previous Office Action

In this Office Action the Examiner has repeated large portions of the previous Office Action. In order to provide for completeness in this response, Applicant responds with a repeat

of Applicant's previous arguments which are set forth herein below.

Claim Rejections - 35 USC § 103

An object of the Applicant's invention is to correct a shift of the focal point due to wave length, focal length, photographing length, brightness and so on. The wave-length difference means the difference of converging point. And, changing this converging point means changing the optical path length (optical distance) by changing the thickness of optical elements with high refractive indices. The invention changes the total thickness of two wedge-shaped prisms disposed between a photographing lens and a solid state image pickup element on the optical axis and thereby changes the optical path length. By changing the optical path length, the invention prevents from shifting of focal point due to the wave-length difference and makes it possible to compensate the longitudinal chromatic aberration.

Masson '204

On the contrary, the reference US Patent 4,249,204 to Masson, the thickness of two groups, each group comprises two prismatic blades, having different index of dispersion from each other are changed respectively, and the total index of dispersion of these two groups is changed so as to compensate the chromatic aberration. This is, the total thickness of the two groups on

the optical axis is not changed, and therefore, the optical path length is not changed as Applicant's invention of claim 1 does (see column 1, lines 34-38).

The following demonstrates a shift of focal point in case of using two materials of substantially same (but not identical) refractive index, but with different indices of dispersion where the thicknesses of materials are not changed. This is based on the Masson '204 disclosure that the materials having the same index of refraction have different dispersion indices

	<u>λ(nm)</u>	<u>Refractive Index</u>	
Material 1	435.8 (blue)	1.63434	
	546.1	1.61685	
	656.3 (red)	1.60806	index of dispersion
			36.7
Material 2	435.8 (blue)	1.62799	
	546.1	1.61671	
	656.3 (red)	1.61067	index of dispersion
			54.7

In case of thicknesses of materials are 10.0mm

Material 1	$10.0/1.63434 = 6.119\text{mm}$ (Blue)
	$10.0/1.60806 = 6.219\text{mm}$ (Red)
Material 2	$10.0/1.62799 = 6.143\text{mm}$ (Blue)

$$10.0/1.61067 = 6.209\text{mm (Red)}$$

$$(6.219-6.119) - (6.209-6.143) = 0.034\text{mm}$$

Material 1 Material 2

Therefore, as shown in the above, the shift (0.034 mm) of the focal point remains.

Masson '204 discloses an optical filter having two prisms (2a) and (2b) and a second two prisms (3a) and (3b). Prisms (2a) and (2b) move in opposite directions to prisms (3a) and (3b). This is shown by the arrows indicated at Figure 1. Since the prism movement is always linked by rack and pinion mechanisms (5a), (5b), (7a), and (7b), there is no independent movement between prisms, such as prisms (2b) and (3b). Stated another way, when (2b) moves in the direction of the arrow shown in Figure 1, prism (3b) also moves in the opposite direction as shown in the arrow in Figure 1. The optical filter of Figure 1 of '204 is a single unit where four prisms move together to form a single optical filter. This optical filter is not of variable thickness, and, therefore, does not respond to Applicant's claimed actuator for changing the thickness of the variable-thickness optical filter. As '204 teaches, the rack and pinion connected prisms are assembled so that the total thickness of the assembly remains constant (see column 2, line 46 - 47, column 2, line 64 - 66, and the last line of claim 1). Applicant claims a

variable-thickness optical filter and Masson '204 teaches away from such a filter.

Next, there can be no actuator for changing the thickness of a variable thickness optical filter because the actuator (rack and pinion mechanisms) (7b) (7a) act together and do not change the thickness of a variable-thickness optical filter. Applicant respectfully submits that not only does '204 not meet the terms of claim 1, it in fact teaches away from claim 1 in that it requires that there be a constant thickness.

The Examiner argued that the actuator (7a) - (7b) moves plates of device (2) and the thickness is adjusted. This is simply incorrect. When both (7a) and (7b) move, the overall thickness of the filter remains the same as shown in Figure 1. Masson is not designed for nor does it disclose a dual use visible/infrared image pickup device having sensitivity ranging from the visible-light range to the infrared range, as set forth in the first three lines of Applicant's claim. The Examiner has not addressed this limitation of the claim at all.

The Examiner asserts that Masson has a means for correcting a shift in focal point caused by chromatic aberration, citing column 1, lines 41 - 57 and Figure 1. Applicant respectfully traverses this assertion by noting that column 1, at lines 40 - 57 does not teach the claimed change of thickness, nor does it suggest it. The phrase "focal point" is not present. The phrase "focal point" does not appear from lines 40 through 53. On the other hand, the reference to focal length in line 56 is with

respect to focal length in a variable focal length lens system. This, however, is not a shift in focal point which would otherwise be caused by longitudinal chromatic aberration. Instead, it is a change produced by varying the focal length in a variable focal-length lens system. Here, it should be noted that the Examiner has made reference to focal point which is a term found in the preamble portion of the claim.

Morofuji '188

The Examiner recognizing that Masson lacks a use of memory for storing a correlation table defining a correlation between photographing conditions and the thickness of the variable-thickness optical filter and a thickness control means which controls the actuator on the basis of memory has asserted that Morofuji would suggest modification of '204 in order to achieve this end.

First, the Examiner should note that Morofuji comes from an art which can not be considered to be analogous to Applicant's claimed visible-light/infrared image pickup device. On the other hand, Morofuji '188 is off the mark in that it is for correction of vibration within an optical apparatus. Morofuji discloses merely a variable angle prism driven on the basis of a vibration signal (not a look up table or memory for storing a correlation table as claimed by Applicant). Applicant's lookup table (memory) is for defining a correlation between photography conditions which are the visible/infrared terms used in line 1 of

claim 1 which is related to thickness (line 6) and change of thickness. Morofuji corrects an angle for vibration. Morofuji simply is from a non-analogous art which does not even relate to an image pickup, infrared, or the like. Instead, Morofuji is a vibration correction device for an optical instrument which corrects for a mechanical error (vibration). The Examiner has relied upon non-analogous art in order to assert that Applicant's claimed invention is obvious. The Examiner asserts that Morofuji discloses use of a memory storing a correlation table defining the correlation between photographic conditions citing column 15, lines 33 -39. In this portion of the specification, the VAP (variable angle prism) response characteristics are calculated. It is on the basis of a calculation result that the optimum correlation parameter is selected from a data table which stores a plurality of frequency correction coefficients prepared in advance. This is related to vibration, not photographic conditions. Stated another way, the photographic conditions would not change if the Morofuji device were held steady. The vibration is a condition of the camera, not photographing conditions.

In Figure 2 of '188, there is shown a typical feed back mechanism (based on Newtonian laws of motion, not optics) for control of the variable angle prism device. In this diagram, it can be easily seen that there is no input, and no consideration of photographing conditions. Instead, the items sensed are angular velocity (4d) and angular displacement (4e). Neither

angular velocity nor angular displacement are photographing conditions. Instead, they are typical measurements of motion as found in Newton's fundamental equations of motion.

The steps S208, S207 and EEPROM 6 discussed in column 15, lines 33 - 47 are shown in Figure 18. These are all functions of angular velocity in yaw and pitch. This is camera motion, and not a photographing condition as claimed. '188 teaches that the field of his invention is variable angle prism drive based upon a vibration detection means for detecting vibration.

Claim 1

Claim 1 sets forth Applicant's invention. This claim must be read as a whole which is in accordance with the mandate of 35 USC § 103. Applicant claims an image pickup element having sensitivity ranging from visible-light range to the infrared range. This is not disclosed in the art of record. Next, Applicant claims that there be a means for correcting a shift in focal point which would otherwise be caused by longitudinal chromatic aberration arising in a photographic lens. As Applicant discloses, this longitudinal chromatic aberration shift is substantial when the visible-light range is shifted to the infrared. It is respectfully requested that the Examiner refer to Applicant's Figures 3A and 3B which show the large shift between the visible-light range and the near infrared range on longitudinal chromatic aberration. It is this shift which is compensated for in Applicant's claimed invention. Applicant

further claims a variable thickness optical filter and actuator for changing the thickness of the variable thickness optical filter. As pointed out above, the optical filter of '204 does not change thickness, but remains the same. Still further, the actuator in '204 does not change the overall thickness of the optical filter, but moves two separate filters in order to maintain the same thickness.

In Applicant's claim there is a memory for storing a correlation table between photographing conditions and the thickness. This is simply not suggested by '204, and there nothing in '188 which would suggest such a correction for the photographing conditions and the thickness of the claimed variable thickness optical filter for the purpose of correcting shift in optical point. Instead, '188 suggests correction for vibration, not shift in optical point as wave length changes (infrared/visible). Claim 1 further claims a thickness control means for controlling the actuator on the basis of a correlation table stored in the memory. There is no thickness control and correlation table stored in memory suggested by the references of record.

Claim 4

In claim 4, Applicant specifies specific photographic conditions. None of these have been addressed by the rejection of claim 4, beginning at line four up from the bottom of page 4.

For this reason, claim 4 has not had all limitations met, and should be clearly allowable.

Claim 5

Claim 5 relates the invention of claim 1 to a photographic zoom lens. The invention of claim 1 necessarily relates to compensation for a single wavelength, such a infrared or visible. On the other hand, as '204 explains in column 1, lines 54 - 56, the system disclosed therein is for correcting of chromatism and distortion aberrations which occur when varying focal length in a variable focal lens system is used. However, this type of correction is a chromatism correction, while Applicant's correction provides for focus at specific lengths. Stated another way, when Applicant's device is adjusted to focus infrared, it will necessarily provide distortion and aberration in the visible range. This also exemplifies the difference Masson and Applicant.

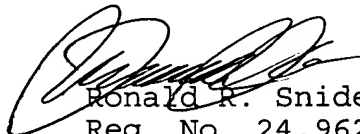
Claim 6

Applicant has respectfully traversed the assertion that the primary reference of Masson in view of Edwards and Morofuji disclose limitations claimed in claim 1. First, it should be noted that Edwards does not even teach the use of the lens forward of the detector (20). Still further, the Examiner does not explain at all how Masson which when lens groups (2) and (3) are combined, provides no change in focal point relates

Applicant's claimed invention in combination with a fixed focus lens. The Examiner has not shown how one of ordinary skill in the art would conceive of the idea of using of the teachings of Masson in view of Morofuji in combination with the point and shoot camera system. It is, therefore, respectfully requested that the Examiner provide the necessary teachings in order to complete this portion of the rejection.

In view of the foregoing, it is respectfully submitted that the application is now in condition for allowance, and early action in accordance thereof is requested. In the event there is any reason why the application cannot be allowed in this current condition, it is respectfully requested that the Examiner contact the undersigned at the number listed below to resolve any problems by Interview or Examiner's Amendment.

Respectfully submitted,



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